Paving and Municipal Engineering.

VOLUME IV.

INDEX.

Annealing Paving Brick ..... *W. Waplington.* 257
Asphalt of Trinidad ..... *W. P. Pierce.* 87
Asphalt Pavements, French and American, Compared ..... *Louis H. Gibson.* 9
Asphalt, The Origin of ..... *Dolphus Torrey.* 319
Asphalt, Trinidad, Deposits ..... *Dolphus Torrey.* 189
Asphaltum in the United States ..... *E. W. Parker.* 284
Brick Machine, The Evolution of the ..... *Cyrus Chambers, Jr.* 202
Brick Pavements, Specifications for 17
Brick, Paving, Annealing ..... *W. Waplington.* 257
Brick, Paving, Differences of Quality ..... *D. V. Purington.* 7
Brick, Paving, Their Manufacture and Use ..... *W. S. Williams.* 147
Brick Street Pavements, from Start to Finish ..... *William Steyh.* 69
Brick Street Pavements in Towns ..... *A. W. Smith.* 322
Cement Sidewalks, and How They Should Be Made ..... *E. L. Martin.* 197
Cements, Natural and Artificial ..... *Spencer B. Newberry.* 337
Civil Engineers, City, Original Responsibility of ..... *Frank Knight.* 139
Clay, Burned, for Roadways ..... *A. W. Smith.* 195
Electric Lighting at Topeka, Kan ..... *Louis Kingman.* 81
Electric Railways, Underground Wiring for 28
Evolution of the Brick Machine, The ..... *Cyrus Chambers, Jr.* 202
France, Locating Roads in ..... *Arthur Lagron, C. E.* 334
France, Maintenance of Roads in ..... *Arthur Lagron, C. E.* 16, 85, 145, 200
French and American Asphalt Pavements Compared ..... *Louis H. Gibson.* 9
Gravel Road Movement in Parke County, Ind ..... *J. T. Campbell.* 260, 325
Heterodoxical Methods in Sewer Construction ..... *William M. Whitten.* 332
Instructions to Sewer Inspectors ..... *Arthur Lagron, C. E.* 78
Lighting, Electric, at Topeka, Kan ..... *Louis Kingman.* 81
Lighting Plants, Street, Municipal Ownership of 267
Locating Roads in France ..... *Arthur Lagron, C. E.* 334
Machine, Brick, The Evolution of the ..... *Cyrus Chambers, Jr.* 202
Maintenance of Roads in France ..... *Arthur Lagron, C. E.*
I 16
II 85
III 145
IV 200
Medina, N. Y., The Sewerage of ..... *O. C. Gillett.* 155
Memphis, The Sewerage System of ..... *Geo. E. Waring, Jr., C. E.* 277
Municipal Equipment and Engineering of Paris. *Maj. J. W. Howard, B. L., C. E.*
I 1
II. Financial Administration 61
III. The Administration of Public Works 125
Municipal Ownership of Street Lighting Plants 267
Natural and Artificial Cements ..... *Spencer B. Newberry.* 337
New Jersey Road Law 30
Old Towns and New Streets ..... *James W. See.* 13
Origin of Asphalt ..... *Dolphus Torrey.* 319
Original Responsibility of City Civil Engineers ..... *Frank Knight.* 139
Paris, Municipal Equipment and Engineering of. *Maj. J. W. Howard. B. L. C. E.*
I 1
II. Financial Administration 61
III. The Administration of Public Works 125

Paris, Wood Pavements in ..... *Louis H. Gibson.* 199
Paved Roadway in City Streets, Width of ..... *S. Whinery.* 256
Pavements, Brick Street, from Start to Finish ..... *William Steyh.* 69
Pavements, Brick Street, in Towns ..... *A. W. Smith.* 322
Pavements, Brick, Specifications for 17
Paving Brick, Annealing ..... *W. Waplington.* 256
Paving Brick; Difference of Quality ..... *D.V. Purington.* 7
Paving, Modern Street, A City Engineer's Views on ..... *Niles Meriwether.* 273
Pavements, Wood, in Paris ..... *Louis H. Gibson.* 199
Planting Trees in the Streets 25
Road Engineering Extraordinary ..... *John Charles King.* 137
Road Law, New Jersey 30
Roads in France, Locating ..... *Arthur Lagron, C. E.* 334
Roads in France, Maintenance of ..... *Arthur Lagron, C. E.* 16, 85, 145, 200
Roadways, Burned Clay for ..... *A. W. Smith.* 195
Sewage Disposal, I ..... *J. Foster Flagg.* 313
Sewage and Sewers, Notes on ..... *Louis H. Gibson.* 132
Sewerage of Medina, N. Y., The ..... *O. C. Gillett.* 155
Sewerage System of Memphis, The ..... *Geo. E. Waring, Jr., C. E.* 277
Sewer Construction, Heterodoxical Methods in ..... *William M. Whitten.* 332
Sewer Inspectors, Instructions to ..... *Arthur Lagron, C. E.* 78
Sidewalks, Cement, and How They Should Be Made ..... *E. L. Martin.* 197
Specifications for Brick Pavements 17
Street Lighting Plants, Municipal Ownership of 267
Streets, New, Old Towns and ..... *James W. See.* 13
Topeka, Kan., Electric Lighting at ..... *Louis Kingman.* 81
Trees, Planting, in the Streets 251
Trinidad Asphalt Deposits ..... *Dolphus Torrey.* 189
Trinidad, Asphalt of ..... *W. P. Pierce.* 87
Underground Wiring for Electric Railways 28
United States, Asphaltum in the ..... *E. W. Parker.* 284
Village Improvement, An Instance of ..... *E. F. Layman.* 143
Water-Works Pumps, Two Methods of Getting Direct High Pressure from, *Geo. A. Ellis.* 214
Width of Paved Roadway in City Streets ..... *S. Whinery.* 256
Wood Pavements in Paris ..... *Louis H. Gibson.* 199

Biographical Sketches—

Campbell, J. T., Portrait 266
Chambers, Jr., Cyrus, Portrait 213
Flagg, J. Foster, Portrait 319
Gibson, Louis H., Portrait 13
Howard, B. L., C. E., Major James W., Portrait 6
King, John Charles, Portrait 138
Lagron, Arthur, C. E., Portrait 17
Layman, E. F., Portrait 145
Martin, E. L., Portrait 199
Purington, D. V., Portrait 9
See, James W 15
Smith, A. W., Portrait 78
Steyh, William, Portrait 78
Torrey, Dolphus, Portrait 195
Waplington, W., Portrait 256

CURRENT INFORMATION.

Asphalt Pavements, Durability of 106
Asphalt Paving, etc., Competition in ..... *A. I. P.* 293
Boston's Proposed System of Rapid Transit 357
Brick and Granite Pavements, Relative Cost of 296
Brick and Tilemakers, Illinois 36
Brick Manufacturers, National Meeting of 34, 101
Brick, Method of Making Hard 34

Brick Paved Highways, Convict Labor and 223
Brick, Paving, A New Kind of 39
Brick, Paving, in Hartford, Ct. 296
Brick, Paving, in the West, Scarcity of 298
Bridge Foundation, Wool Used for a 35
Bridge, Mississippi, Data Regarding a ..... *C. L. Annan.* 101
Bridge, Plans for a Great 356
Chicago, Estimates for Public Work in 164
City Engineer's Report, Notes from a 355
Cleaning of Street Railways 354
Closed Conduits for Electric Street Railways 224
Competition in Asphalt Paving, etc. 293
Construction of a Roman Road 356
Convict Labor and Brick-Paved Highways 223
Electric Cars, Street Indicator for 35
Electric Street Railways, Closed Conduits for 224
Engineering Society's Annual Meeting, Indiana 35, 161
Engineers at the World's Fair 296
Estimates for Public Works in Chicago 164
England, Highways in, Cost of 225
Excavator, An Electric 36
Fir Block Paving in Tacoma, Wash 297
Flood Waves in Sewers 100
Franchises, Municipal Control of 165
Gas Light, Legislation Requiring Better ..... *A. I. P.* 97
Glasgow, Paving Brick in 106
Granite of Great Crushing Strength 106
Granite Pavements, Relative Cost of Brick and 296
Hartford, Conn., Paving Brick in 296
Highway Association, Massachusetts 225
Highways, Brick Paved, Convict Labor and 223
Highways in England, Cost of 225
Illinois Brick and Tile Makers 36
Indiana Engineering Society's Annual Meeting 35, 161
Inventions, Some Recent ..... *V. H. Lockwood.* 102, 162, 225, 298, 357
Legal Decisions, Recent 36, 103, 227
Legislation Requiring Better Gas Light ..... *A. I. P.* 97
Light, Gas, Legislation Requiring Better ..... *A. I. P.* 97
Louisville, Ky., Need of Better Sewerage at 296
Louisville's Street Pavements 357
Maryland, State Road Convention in 38
Massachusetts Highway Association 225
Memphis, Tenn., Public Works in 221
Mississippi River Bridge, Data Regarding a ..... *C. L. Annan.* 101
Municipal Control of Franchises 165
Municipal Engineering News from the National Capital ..... *Egbert Earle.* 95
Municipal Matters at the National Capital ..... *A. I. P.* 159
National Meeting of Brick Manufacturers 34, 101
National Road Department, The Proposed 222
New Paving Brick Company, A 357
New York City's Water Supply 165
New York, Rapid Transit in 33, 99
Notes from a City Engineer's Report 355
Omaha, Sewers and Pavements in 349
Opinions as to the Merits of Pavements 160
Pavements, Brick and Granite, Relative Cost of 296
Pavements, Opinions as to the Merits of 160
Pavements, Sand Foundations for 221
Pavements, Street, Louisville's 357
Pavements, Street, To Protect 39
Paving Brick, A New Kind of 39
Paving Brick Company, A New 357

Paving Brick in Glasgow 106
Paving Brick in Hartford, Conn 296
Paving Brick in the West, Scarcity of 298
Paving, Fir Block, in Tacoma, Wash 297
Paving, Fire Brick, in Wilmington, Del., Cost of 39
Personals 39, 106, 165, 228, 300, 359
Philadelphia, Director Windrim's Work in 297
Philadelphia, Water Used in 298
Pipe Laying in River Maas 164
Plans for a Great Bridge 356
Pollution of Streams by Sewage 33
Public Work in Chicago, Estimates of 164
Public Work in Memphis, Tenn 221
Public Work in Washington, D. C., Cost of 225
Rapid Transit, Boston's Proposed System of 357
Rapid Transit Brings Prosperity 298
Rapid Transit in New York 33, 99
Road Convention in Maryland, State 38
Road Department, The Proposed National 222
Road, Roman, Construction of a 356
Sand Foundations for Pavements 221
Seattle, Wash., Street Paving in 355
Sewage, Disposal of 223
Sewage, Pollution of Streams by 33
Sewerage at Louisville, Need of Better 296
Sewer, Cost of a Colorado 105
Sewer Workmen, Good Health of 165
Sewers and Pavements in Omaha 349
Sewers, Flood Waves in 100
Street Crossing Stones 228
Street Indicator for Electric Cars 35
Street Pavements, Louisville's 357
Street Pavements, To Protect 39
Street Paving, Ignorant Opposition to 221
Street Paving in Seattle 355
Street Railway Franchise, Remarkable Sale of a 228
Street Railways, Cleaning of 354
Street Railways, Electric, Closed Conduits for 224
Street Railway Statistics 100
Street Repairs and Wide Tires 353
Tacoma, Wash., Fir Block Paving in 297
Tires, Wide, Street Repairs and 353
Tires, Width of, Requirements as to 162
Washington, D. C., Cost of Public Works in 225
Washington, D. C., Municipal Engineering News From ..... *Egbert Earle.* 95
Washington, D. C., Municipal Matters at ..... *A. I. P.* 159
Water Supply, New York City's 165
Water used in Philadelphia 298
Water-works, Cost of, in Small Cities 32
Water-works Intake in Lake Sebago, Laying a 105
Wilmington, Del., Cost of Fire Brick Paving in 39
Wool Used for a Bridge Foundation 35
World's Fair, Engineers at the 296

LETTERS FOR THE PUBLIC.

Asphalt, Natural Rock *vs.* Trinidad Pitch Compounds ..... *W. H. Delano.* 167
Asphalt Paving in Paris, American ..... *Julius Schubert.* 108
Brick Liner for Street Car Rails, A ..... *N. B. Abbott.* 360
Brick Pavements, Foundation and Construction of ..... *Wm. M. Whitten.* 41
Brick Pavements, Foundations for ..... *F. W. Cerny.* 107

Brick Streets, Damage to, by Electric Cars.....*F. W. Cerny.* 232
Columbus, Ohio, Lessons from Paving at.....*N. B. Abbott.* 231
Comparative Cost of Paved Streets.....*J. M. Heiskell.* 361
Concrete or Artificial Stone for Street Paving...{*Paver, Warner H. Jenkins, G. W. Bartholomew, Jr.*} 229
Electric Cars, Damage to Brick Streets by.....*F. W. Cerny.* 232
Engineering Work in Plainfield, N. J.....*Robt. H. Meeker* 171
Foundation and Construction of Brick Pavements.....*Wm. M. Whitten.* 41
Foundations for Brick Street Pavements.....*F. W. Cerny.* 107
Foundations, Slag, Unsatisfactory.....*F. M. Lillie, C. E.* 301
Grades of Streets, Questions as to.....*F. P. Lockling.* 168
Hindrances to Efficient Public Works.....*F. W. Cerny.* 166
Importance of Wide Wheel Tires, The.....*J. M. Heiskell, M. E.* 42
Lessons from Paving at Columbus, Ohio.....*N. B. Abbott.* 231
Nomenclature of Asphalt Pavements.....{*Prof. E. J. De Smedt, W. H. Delano.*} 40
Paris, American Asphalt Paving in.....*Julius Schubert.* 108
Paved Streets, Comparative Cost of.....*J. M. Heiskell.* 361
Pavements along T Rails, Construction of.....*Warren-Scharf Co.* 170
Pavements, Brick, Foundation and Construction of.....*Wm. M. Whitten.* 41
Pavements, Brick, Foundations for.....*F. W. Cerny.* 107
Paving at Columbus, Ohio, Lessons from.....*N. B. Abbott.* 231
Paving Block Plant, A Good Place for a.....*C. L. Stinson.* 302
Paving Experiment of Army Officers in Wyoming.....*Dr. H. I. Raymond.* 169
Plainfield, N. J., Engineering Work in.....*Robt. H. Meeker.* 171
Public Work, Efficient, Hindrances to.....*F. W. Cerny.* 166
Roadbed of Street Railway Tracks.....*H. M. Gates.* 361
Schubert Again Replies to Mr. Delano, Mr.....*Julius Schubert.* 232
Sewerage and Sewage Disposal, Titles of Works on..... 302
Slag Foundations Unsatisfactory.....*F. M. Lillie, C. E.* 301
Street Car Rails, A Brick Liner for.....*N. B. Abbott.* 360
Street Paving, Concrete or Artificial Stone for.....{*Paver, Warner H. Jenkins, G. W. Bartholomew, Jr.*} 229
Street Railway Tracks, Roadbeds of.....*H. M. Gates.* 361
Tires, Wide, The Importance of.....*J. M. Heiskell, M. E.* 42
Trinidad Pitch Compounds, Natural Rock Asphalt *vs*.....*W. H. Delano.* 167
Wheel Tires, Wide, The Importance of.....*J. M. Heiskell, M. E.* 42

SELECTIONS FROM THE PRESS.

Brick, Paving, The Market for..... 113
Brick, Vitrified, The General Demand for..... 46
Bridge Builders, British and American..... 43
Bridge, Concrete Highway, in Germany..... 234
British and American Bridge Builders..... 43
Concrete Highway Bridge in Germany..... 234
Decentralizing Effect of Five-Cent Fares..... 174
Electric Railway Building..... 109
Electric Street Railways, Cost of Operating..... 177
Elevated Sidewalks..... 45
Fares, Decentralizing Effect of Five-Cent..... 174
Gas Light, The Improved Welsbach Incandescent..... 175
Germany, Concrete Highway Bridge in..... 234
Granite Quarries, Paving Blocks from Maine..... 175
How to Tear Up a Street..... 44
Increased Earnings of Rapid Transit..... 110
Insurance Rates, The Trolley and..... 109
London Water Supply System..... 365
Louisville's Demand for Good Street Pavements..... 46
Mail Cars, Trolley..... 366

Maine Granite Quarries, Paving Blocks from 175
Natural Portland Cement, A 366
New York City's Sewage Disposal 111
Ohio, Paving Brick Combine in 173
Pavements, Louisville's Demand for Good Street 46
Pavements, Street, Pyrite Refuse for 366
Pavements, Vitrified Brick, Superiority of 173
Paving Blocks from Maine Granite Quarries 175
Paving Brick Combine in Ohio 173
Paving Problem, The 177
Paving, T Rail 172
Paving, T Rail and Brick 365
Philadelphia Trolley Road, The 110
Portland Cement, A Natural 364
Pyrite Refuse for Street Pavements 368
Rapid Transit, Increased Earnings of 110
Sewage Disposal, New York City's 111
Sewerage System of Wilmington, Del 111
Sidewalks, Elevated 45
Storage Battery System of Traction, A New 235
Street, How to Tear Up a 44
Street Railway Accidents, Cause of 234
Street Railways, Electric, Cost of Operating 177
T Rail, The, and Brick Paving 367
T Rail, Paving 172
Trolley and Insurance Rates, The 109
Trolley Mail Cars 368
Trolley Road, The Philadelphia 110
Welsbach Incandescent Gas Light, The Improved 175
Wilmington, Del., Sewerage System of 111
Water Supply System, London's 363

MACHINERY AND TRADE.

Brick Drying 48
Brick Machine, An Improved 239
Brick Machine, Improvements in a 236
Brick Repressing 178
Brick Repressing and Represses 367
Clutch, Flexible Friction 50
Machinery, Paving Brick, Popular Features in 177
New Asphalt Paving Works 367
Notes 51, 179, 240, 303, 368
Oil Engines for Street Cars 368
Pictures for Brick Manufacturers 364
Roller, Pope's Reversible 302
Roller, Steam, The Erie 50
Street Cars, Oil Engines for 303
Street Sweeper, Good Points of a 239
Transfer Car for Artificial Brick Driers, A New 49
Water Pipe, A Lead-Lined Iron 49

IMPROVEMENT AND CONTRACTING NEWS.

Bridges 59, 122, 186, 248, 310, 373
Municipal Bonds 312, 374
Paving 53, 116, 181, 242, 304, 369
Public Parks 60, 123, 187, 250, 311, 374
Sewerage 55, 119, 183, 245, 306, 370
Street Lighting 60, 123, 187, 249, 311, 373
Street Railways 60, 124, 188, 250, 312, 374
Water-Works 58, 121, 185, 247, 308, 372